wjpmr, 2019,5(3), 82-87

SJIF Impact Factor: 4.639

WORLD JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH

www.wjpmr.com

Review Article

ISSN 2455-3301

WJPMR

# AN OVERVIEW OF BOTANICAL AND THERAPEUTIC ASPECTS OF ARAGVADH-[CASSIA FISTULA LINN]

**Dr. Manisha Sharma*[1], Dr. Jagdish Mohan Onkar[2] and Dr. Omprakash Sharma[3]**

[1]PG Scholar Deptt. of Dravyaguna, Sriganganagar College of Ayurvedic Science & Hospital, Tantia University, Sriganganagar – 335001, India.

[2]Associate Professor Deptt. of Dravyaguna, Sriganganagar College of Ayurvedic Science & Hospital, Tantia University, Sriganganagar – 335001, India.

[3]Professor & H.O.D. Deptt. of Dravyaguna, Sriganganagar College of Ayurvedic Science & Hospital, Tantia University, Sriganganagar – 335001, India.

***Corresponding Author: Dr. Manisha Sharma**

PG Scholar Deptt. of Dravyaguna, Sriganganagar College of Ayurvedic Science & Hospital, Tantia University, Sriganganagar – 335001, India.

**Article Received on 10/01/2019** **Article Revised on 30/01/2019** **Article Accepted on 21/02/2019**

## ABSTRACT

**Aragvadha [Cassia Fistula linn.],** commonly known as the Golden shower, Indian Laburnum, Rajavriksha. It is often used as a highly effective moderate laxative that is safe even for children. It is recommended for the treatment of Jaundice, Gout, Fatty liver, Liver disorders, Bronchitis, Skin diseases and so on. In Ayurvedic medicine, Golden shower TREE IS KNOWN AS "DISEASES KILLER" and it pacifies the 3 doshas of vaat, pitta and kapha. It expels the pitta and kapha from the body. Medicinally it has been various pharmacological activities like antifungal, antioxidants, antimicrobial and anti inflammatory and hepatoprotective activity. Cassia Fistula is also employed as a remedy for tumors of the abdomen, glands, liver, stomach and throat for burns, cancer, constipation, convulsions, delirium, dysuria, epilepsy, hematuria, pimples and glandular tumors. The main aim of this article is to highlight on "**An Overview of Botanical And Therapeutic Aspects of Aragvadha –[Cassia Fistula Linn].**

**KEYWORDS:** Cassia Fistula, Herbal Medicine, Constipation, Gout, Anti microbial.

## INTRODUCTION

Ayurveda, the Indian system of medicine, practiced since a long time for leading a diseases free life. It relies mainly upon the medicinal plants for the management of various ailments. There are a wide range of the medicinal plants described in the ayurveda. Some of these plants are extinct and some are still unidentified. A few plants still used as the richest sources of the medicines since the ages. **Aragvadha (Cassia fistula Linn**.) is one such plant drug which is being used in the medicines. There is no direct reference mentioned about Aragvadha in vedic period. In samhita kala almost all text has been mentioned about description of Aragvadha. Charaka, Sushruta and Vaghbhatta described the uses of Aragvadha in more than one place and they given more than 30 synonyms according to different parts and characters. Instead of single drug, Aragvadha is mentioned in compound formulation. Most of the formulations are used as Kushthaghna karma.

Synonyms properties, actions, indication of different part of Aragvadha are mentioned in Dhanvantri Nighantu, Shodala Nighantu, Abhidhana Ratnamala, Kayadeva Nighantu, Madanpal Nighantu, Bhavprakasha Nighantu, Raja Nighantu, Priya Nighantu etc.

More than 67synonyms of Aragvadha are mentioned in nighantus. Among them repeatedly used synonyms are Arevat, Kamikar, Kritamal, Chaturangula, Drighaphala, Rajvriksha, Shampak, Swaranavriksha.

In Adhunika kala of Ayurveda, Aragvadha is described in various texts i.e. Dravyaguna vigyan; The Ayurvedic Pharmacopoeia of India; Ayurvedic Pharmacology of therapeutics uses of medicinal plants, Vanaushadi chandrodaya, Vanaushadi Ratanakar & Dravyaguna Hastammalaka.

The plant Aragvadha is also mentioned in modern books like The Wealth of India, Flora of Gujarat State, Database on medicinal plant, Quality Standards of Indian Medicinal Plants, The Flora of the Presidency of Bombay etc.

Most of the authors mentioned Aragvadha is having Madhur, Tikta, ras; Guruguna; Sheeta veerya and Madhur Vipaka.

The fruit pod of Aragvadha is having major chemical constituents like rhein dianthraquinone glucosides, Sennoside A, Sennoside B and fistulic acid.

Medicinally it has been various pharmacological activities like antimicrobial, antifungal, antipyretic, analgesic, anti-inflammatory, antioxidant, antitumor, hepatoprotective, hypoglycemic activities and antidiabetic activity and laxative properties.

**Botanical Aspects**
**Botanical name**
Genus: Cassia
Species: fistula
Authority: Linn.
**Family**: Caesalpiniaceae

**Taxonomical classification**:
Kingdom: Plantae
Division: Spermatophytae
Subdivision: Angiospermae
Class: Dicotyledonae
Subclass: Polypetalae
Series: Calyciflorae
Order: Rosales
Family: Leguminosae
Subfamily: Caesalpiniaceae
Genus: Cassia
Species: fistula

**Botanical description**
**Habit:** It is moderate to medium sized deciduous tree, 8to 15 m inheight with a straight trunk and spreading branches. The stem bark is greenish pale gray, smooth and slender when young and dark brown, rough when old.

**Habitat:** Plant distributed throughout the greater part of India,Ascending upto and altitude of 1220m in the sub-Himalayan tract and outer Himalaya, in Kumaon, chiefly in Haridwar, Narendra Nagar, Dehradun, Kashipur and abundant in deciduous forest tracts throughout upper gangetic plain of Bengal, Central India and deciduous forests of South India. It is a favourite garden, avenue and ornamental tree being planted commonly. Found also in Ceylon, Malaya, China and other regions.

**Root:** Root is reddish brown and rough externally with numerous horizontal lenticels. The outermost tissue of bark can be peeled off easily. The inner surface of fresh bark is smooth and light pink in color. The wood is porous, light yellow in colour and fibrous, irregular, woody fracture.

**Stem:** When young the outer surface of stem is compact, about 0.2inch thick, smooth and greenish to pale gray in color but olden stem are dark brown to grayish white with rough surface; wood is porous, yellowish white in colour; fracture tough rough.

**Leaf**: Paripinnately, compound and alternate, exstipules 20-40cm long, leaf base pulvinous, ovate.

**Leaflets**: With 3-8 pairs of opposite leaflet, acute or shortly acuminate, ovate-lanceolate, base cuneate;2-5 inch by 1.5-3.75 inch, subcoriaceous, glabrous and bright-green above, pale and more or less silvery pubescent below, particularly on the nervation beneath; lateral nerves numerous, branching; petiolules 0.25-0.5inch long, stipules minute ,pubescent.

**Inflorescence**: Axillary or extra axillary pendent, lax, branched racemes.
**Flower**: Flowers large, fragrant, bright yellow, in lax, pendulous racemes, 12-20 inch long; pedicels1.5-2.5inch long, pubescent; bracts minute, caduceus.
**Calx**: 0.4 inch long, divided to base; segments oblong, obtuse, puberulous.
**Corolla**: 1.5inch across; petals obovate, veined, shortly clawed.
**Androecium**: 10 Stamens, in two whorls of 5 each, all antheriferous;3 lower largest with curved filaments and oblong anthers, dehiscing longitudinally; 4 with short filaments, the anthers dehiscing by basal pores; remaining 3 short, the anthers without pollen.
**Gynoecium:** Monocarpellary, marginal placentation.

**Fruit:** Pods are cylindrical, 40-70cm long and 3-4cm in diameter, straight or slightly curved, pendulous, smooth, shining dark brown, indehiscent, finely striated transversally; seeds numerous, horizontal, in black, sweet pulp and completely separated by thin, transverse dissepiments, each compartment filled with black pulp and containing one seed.

**Seed:** Seeds, numbering 25 to 100 in each pod, are small, ovoid, slightly compressed, parallel with dissepiments, smooth shining and yellowish brown with a well marked raphe; cotyledons flat; albumen horny.

**Wood**
**Sapwood:** wide, white or pale dirty white in colour; perishable.
**Heartwood**: It ranging in colour from grayish or light yellowish red to brick red or light reddish brown, often withdarker streaks, ageing to dark purplish brown, or nearly black resembling old Cuban mahobany, hard, strong and durable. Annual- rings distinction the heartwood. Pores moderate – sized enclosed in and joined by wavy disconnected or anastomosing bands. Weights 60 lbs to the cub.ft.

**Timber**: It is somewhat lustrous when first exposed, very strong, tough, smooth, durable, very heavy, very hard (wt. 801kg/m3), brittle, straight usually of small dimensions, owing to the large sapwood, is some what brittle and liable to splinter, used for carts and agricultural implements.

**Flowering and Fruiting season**
Flowering season: April – July
Fruiting season: August – September
Mature fruits: April –up to 1 year

**Varga/classification-**
As regards to the classification of drugs, the ancient scholars have difference of opinion.Every body adopted different methodology according to his intellectual savvy. Depending upon the drug origin, morphology, property, pharmacodynamics and therapeutic values, ancient texts have classified the drugs into Mahakashaya, Ganas.

**Classification of ARAGVADHA in different Ayurvedic texts**

| Name of text | Gana/Varga/Skandha |
|---|---|
| Charak Samhita | Kusthaghana, Kandughana, Virechana and Tiktaskanda |
| Sushruta Samhita | Aragvadhadi, Shyamadi, Adhobhagahar, Aragvadhadi |
| Ashtanga Hridaya | Aragvadhadi |
| Dhanvantri Nighantu | Guduchyadi varga |
| Shodala Nighantu | Namsamgra :Guduchyadi varga |
| Madanpal Nighantu | Abhayadi varga |
| Raj Nighantu | Prabhadradi varga |
| Kaidev Nighantu | Aushadi varga |
| Bhavaprakah Nighantu | Haritakyadi varga |
| Shaligram Nighantu | Asta varga |
| Adarsh Nighantu | Pootikaranjadi varga |
| Saraswati Nighantu | Mahavriksha varaga |
| Priya Nighantu | Haritakyadi varga |
| Brihatanighnturatnakar | Aragvadhadi gana |
| Dravyaguna Hastamalak | Pootikaranjadi kula |
| Hridyadipaka Nighantu and Siddhamantra | Vattapittaghana, Kaphapitta |

**Vernacular names**
English – Purging Cassia
Hindi - Amaltas
Sanskrit – Rajvruksha, Shampaaka, Chaturangula, Vyadhidhaata etc.
Bengali - Sonalia, Bandarlatti
Kannada – Heggaka
Marathi – Bahava
Tamil - Konrai, Komare

**Sanskrit synonyms**
Rajvruksha: a kind of tre commonly found in the forests
Vyadhidhaat: Curing many ailments
Dandaphala: having stick –like long fruits

**Rasa Panchaka**
A drug acts by its potency, which implies all the qualities of drugs by which they act, viz, Guna, Rasa, Vipaka, Veerya and Prabhava. The chemical structure of drug is indicated by Rasa and Vipaaka, and the Guna and Veerya indicate the physico pharmacological properties of the drugs.

A Drug performs certain local and general actions by its Rasa and Guna, and certain specific therapeutic actions by its Vipaka and Veerya.

**Pharmacological properties**
Ras –Madhur
Taste – Sweet
Guna –Guru, Mridu, Snigdha
Physical property – Soft, heavy, unctuous
Virya –Sheet
Potency –cold
Vipaka -Madhur
Metabolic property –Sweet
Karma – Rechana

**For flower**
Rasa: Tikta, Madhur, Kasaya
Guna: Snighdha
Veerya: Sheeta
Vipaka: Madhura
Doshakarma: Vata pittanashaka

Rasapanchak of **Aragvadha** according to different Nighantu.

| Sr. No. | Nighantu | Rasa | Guna | Veerya | Vipaka | Doshkarma |
|---|---|---|---|---|---|---|
| 1. | Dhanwantri Nighantu | Tikta | Guru | Ushna | _ | Tridoshshamak |
| 2. | Madanpal Nighantu | Madhur | Guru | Sheeta | Madhur | Tridoshshamak |
| 3. | Raja Nighantu | Madhur | Guru | Sheeta | Madhur | Tridoshshamak |
| 4. | Kaideva Nighantu | Tikta, Madhur | Guru | Sheeta | _ | Tridoshshamak |
| 5. | Bhavaprakash Nighantu | Madhur | Guru | Sheeta | _ | Tridoshshamak |
| 6. | Shaligram Nighantu | Madhur | Snighdha, Guru | Sheeta | Madhur | Pittanashak |
| 7. | Adarsh Nighantu | Madhur, Tikta | _ | Sheeta | Madhur | Kaphapittashamak |

**Karma**:- Kushtaghna, kandughna, Raktashodhak, Sransamana, Mriduvirech, Anuloman. Koshtsuddhikar, Ruchivardhak, Yakrutduttejaka, Hradya, Sothahar, Kaphanihsaraka, Mutrajanana, Dahaprashmana, Amapachaka, Pittashamak, Samshodhak, Jwaraghana, Sulaprasamana.

**Srotogamitva**
**Dhosh**: Pitta, Kapha
**Dhatu**: Rakta (liver stimulant)
**Mala**: Purgative

**Chemical constituents**
**Plant**: It contains seven biflavonoids and two triflavonoids, clitorin, chrysophanic acid, emodin, epicatechin (-)-epiafzelechin, its 3-0 glucoside, kaemoferol-3-β-glucoside, kaempfenol-3-neohesperidoside, phlobaphene and procynadin.

**Stem –Bark:** It is having lupeol, β-sitosterol, hexacosanol tannin.

**Root- Bark and Heartwood**: Root – bark besides tannin contains phobaphenes and oxyanthraquinone substance which probably consist of mixture of emodin and chryosaphinicacid. It also contains fistucacidin identified as recemic or meso 3,4,4'7,8-pentahydroxyflavan, barbaloin and rhein, fistucacidin, an optically inactive leucoanthocynadinin, 3,4,7,84'-pentahydroxy flavan.

**Sap wood**: Leucoanthocynadinin-5,4'dihydroxy flavan-3,4-diol and a dimeric proanthocynidin along with (-) epiafzelechin, (+) catechin, kaempferol, dihydrokaemp ferol, 1, 8- dihydroxy -3 methylanthraquinone

**Leaves**:- It contains anthraquinone derivatives, very little tannin, sennosides A&B, rhein and its glucoside.

**Flowers**:- Ceryl alcohol, fistulin, rhein dianthraquinone glycoside, kaempferol, leucopelargonodin tetramer having free glycol unit, kaempferol-3-β- glucoside, kaempferol-3-neohesperidosid and clitorin.

**Pod**: Having rhein dianthraquinone glucoside and fistulic acid.

**Fruit pulp**:- It consists of glucose 60%, resin, the major anthrax quinine derivetives, colouring matter, calcium oxalate, minerals, gum, resinous substance and water.

Fruit pulp is rich in protein (19.94%), carbohydrates (26.3%). The amino acid composition of the protein is as foolow :alanine, 1.75;aspartic acid,2.15; glutamic acids, 2.89; glycin, 2.26; ornithine, 2.12;tyrosine, 1.3; arginine, 1.3; leucne, 0.69; methionone, 0.8; phenylalanine, 0.71; tryptophan,1.09. The pulp contains sennosides A&B, rhein and its glucosides, barbalon, aloin, formic acid, butyric acid, their ethyl esters and oxalic acid. Presence of pectin, tannin, maltose. Glucose, fructose and sucrose and a small quantity of volatile oil is also reported.

**Major**: Sennoside A, Sennoside B, Rhein.

**Medicinal Properties of Plant**
**1. Pharmacological action**: Hypoglycemic, Anticancer, abortifacient, anti colic, anti infertility, estrogenic, laxative, anti bacterial, antipyretics anti-inflammatory, smooth muscle stimulant, anti arthritic, anti tussive, purgative, analgesic, anti-fungal, anti viral, hepatoprotective, anti – implantation.

**2. Karma: (main action):-** Kushthaghna.

**3. Rogaghnata**:- Aruchi, Svasa, Shotha, Rakta vikara, Chardi, Hikka, trishna, Raktapitta, Arsha, Amlapitta, Mootravikara, Agnidagdhavrana, Vrana ruja, visphot, Medoroga, Kaphavatajavikkara, Vatapittikavikara, Ardhavabhedka, Vatavyadhi, Atisara, Hridroga, Kasa, Mootraghata, Ashmari, Shukradaurbalya, Jwara, Shosha, Tridosha, Vaman, Hikka, Aadhman, Sannipata, Srotorodha.

**4. Bahya**: Kustha-kandu-dadru-kitibha-pama, Vrana-vranasotha- sadhyovrana, vatavikara-vedanashoth-sandhivatta, Mukha-galaroga, Gandamala- granthi.

**5. Abhyantar:-** Vibhanda-Kosthagatamala-vistambha, Udarroga-udavarta – sula- aruchi, Yakrucchotha-kamala-pittodar- pandu, hridrog- raktapitta- soth, Kustha- daha-tvagvikara-visarpa, Jwara- pittajvara, Vatavyadhi-vatarakta – urustambha, Mrutrakuccha- prameha-haridrameha, Uoadmasa, Suskasa- Svaskasta, Sittapitta.

**Therapeutic Utilities of the Plant**
**→Kamala – Aragvadha (fruit pulp) is** given with the juice of sugarcane or vidari or Amalaki after fortifying with Trikatu (A.H)

पित ज्वरे .....द्राक्षाडरवधयोर्वापि। वैांतंकंजजं
**गण्डमालायाम्** आरग्वधषिफा क्षिप्रं पिट्वा तण्डुलवारिणा।
सम्यंअस्यप्रलेपाभ्यां गण्डमालाहराः पराः।। (Chakaradatta 41-19)

**कफजपाण्डुरोगे** आरग्वधं रसेनेक्षोर्विदार्यामलकस्य च।
सत्र्यूणं बिल्वपत्रं पिबेत्रा कामलापहतम्।। (Ca. chi. 16-58/59)

**आरग्वधाद्यवलेहः**
कायोणाथवा तस्य त्रिवृच्चुर्ण गुडान्वितम्।
साधयित्वा 'ानैर्लेहं लेहयेन्मात्रया नरम्।। (Ca. kal 8-12)

**कुठचिकित्सायाम्**
चतुडर्गुलदलप्रलेपः। (Chakradatta, Kushtha chi. 50/7)

**आरग्वधस्य विविधयोगाः**
द्राक्षा रसे सुरासीध्वोर्दध्नि चामलकीरसे।
सौवीरके काये च त्रिवृतो बिल्वकस्य च।।**17**।।
लेहेऽरिटे धृतेद्वे चय ोग द्वादष कीर्तिताः।।
चतुडर्गुलकल्पेऽस्मिन् सुकुमाराः सुखोद्याः ।।**18**।।

**आरग्वधादिगणपरिचनम्ः**
आरग्वधादिक्वाथेन परिकञ्च दापयेत्।
(B.N.upadanshaadhikar 51/12)

**आरग्वधपत्रप्रयोगः**
आरग्वधस्य पत्राणि भृ''ष्टानि कटुतैलतः।
आमन्घानि नरः कुर्यात्सायं भक्तावृतानि च।।
(B.N. chikitsa. 26/53)

**Systemwise**
**External uses**:- It is anti- inflammatory, analgesic. The pulp and leaf paste are used in nodular oedema, gout, rheumatoid arthritis etc. The decoction is used for gargling in diseases of oral cavity and throat. Leaf paste is used in skin diseases and itching.

**Internal uses**
**Nervous System:** it is analgesic by vatahar property, so useful in vata diseases.

**Digestive System:** It is bitter so improve taste. It is a liver stimulant and pugative by snighdha property. It is a mild purgative drug and is useful in constipation and jaundice.

**Circulatory System:** It is cardio-protective, anti-inflammatory, purifies blood so useful in heart diseases, haemorrhagic disorder, gout and swelling.

**Respiratory System:** As it is madhura, snigdha, removes kapha soothes internal organs by mridu property, in dry cough and dyspnoea flower's avaleha is given.

**Urinary System:** Diuretic by sheet property. It soothes the urinary tract, Seeds are antidiabetic.

**Skin:** Kushthaghna and refrigerant, so used in skin diseass and burning.

**Temperature:** It is Anti pyretics, used in fever and purgation. Its bitter taste works in digestion and is pittashamaka. Bark of root is used in fever.

**Antimicrobial activity-** The leaves, stem bark and fruit pulp showed antibacterial activity. The fruit pulp was the most potent in this respect. The activity might be due to the presence of flavonoids.

**Heptoprotective activity**- It has improved in the markers of hepatic toxicity and oxidative stress.

**Effect on chikungunya-** The crude extract of this plant has repellent agent against chikungunia vector mosquito.

**Laxative activity**-In vitro effect of cassiafistula in fusion on isolated on guinea pig ileum study concluded that C.fistula pod in fusion possesses significant dose dependent laxative activity.

**Antipyretic activity-** The pods of Cassia fistula was found to be devoid of antipyretic activity in experimental models.

**Effect on skin diseases**-Cassia fistula is having a significant effect in ameliorating the skin diseases due to pitta origin and is safe drug choice of purgation therapy.

**Cassia fistula is** a great herbal remedy for constipation associated with pitta imbalance.

**It also helps to** vitiate all three body energies that is Vata, Pitta and Kapha body energy.

**It is also** good for cardiac problems like heart burn.

**The herb** is used in bloating and severe abdominal pain.

**Aragvadha** can be given in all liver and gallbladder conditions.Even in Ascitis, it can be used effectively to control abdominal distension and digestive problems.

**Because** of its neutralizing action on the body energies, Aragvadha helps to keep all doshas and dhatus in balance. The herb manages blood disorders, gout, anemia and erysipelas etc problems.

It is anti-pyretic and best used in bleeding disorders.

**Useful Part**- Fruit pulp, Root bark, Flower, Leaf, Seed.

**Dosage**
Fruit pulp: 5to10gm
For purgation: 10to20gm
Root-bark decoction: 50 to 100ml
Flowers: 5 to10gm
Leaves: Mainly external use

**Formulation**
Aragvadhadi kvatha, Aragvadhadi taila, Aragvadhadi leha, Aragvadhaarishta, Aragvadhapushpasava, Mahamarichyadi taila, Mahamanjisshthadyarishta, Rasanadi kvath yoga.

**Cultivation and Collection**
The plant is often cultivated as on ornamental plant in the gardens and on roadsides. The fruit are collected when ripe and then these are kept under the soil for seven days and dried in the sun. The pulp is to be separated after this and stored in airtight containers.

## CONCLUSION

Many research studies it is concluded that Cassia fistula is responsible for the various therapeutic potentials like antidiabetic, hepatoprotective, anticancer, antibacterial, wound healing, laxative, larvicidal and ovicidal activity, CNS activity, anti-itching, anti-ulcer, protease inhibitor, antipyretic, antitussive, anti-inflammatory, antioxidant, anti-parasitic. It is also useful herbal plant for hepatic disorder and lipolipedic activity.

## REFERENCES


1. Acharya Charak, Charaka Samhita, Vol.1&II, Edited and Published by Brahmanand Tripathi, Chaukhambha Surbhrati Prakashan, Varanasi, Reprint, 2008.
2. Acharya Susruta, Susruta Samhita, Reprint Edition, Part 1 & II, Edited with Ayurveda – Tattva-Sandipika by Kaviraja Ambikadutta Shastri, Chaukhambha Sanskrit Sansthan, Varanasi- 221001, 2007.
3. Acharya Vagbhata, Ashtangahridayam, Edited 1st, Collated by Dr. Brahmanand Tripathi, Chaukhambha Sanskrit Pratishthan, Delhi. Reprint Edition, 2007.
4. Acharya Priyavrat Sharma, Dhanvantari Nighantu, Edition 3rd, Chaukhambha Orientalia, Varanasi, 2005.
5. Vaidya Acharya Shodhala, Prof. Priyavrat Sharma, Sodhala nighantu, Edition 1st, Oriental Institute, Baroda, 1978.
6. Dr. IndradeoTripathi, Raja Nighantu, Chaukhambha Krishnadas Academy, Varanasi, 2003.
7. Acharya P.V. Sharma and Dr. Guruprasad Sharma, Kaiyadev Nighantu, Edition 1st, Chaukhambha Orientalia, Varanasi, 2006.
8. Dr. K. C. Chunekar, Bhavaprakash Nighantu, Reprint Chaukhambha Bharti Academy, Varanasi-221001, 2006.
9. Shaligram, Shaligram Nighantu, Part 7-8, Khemaraja Shree Krishnadasa Prakashan, Mumbai-4, 2007.
10. Prof. Priyavrat Sharma, Priya Nighantu, Edited 1st, Chaukhambha Surbharti Prakashan, Varanasi, 2004.
11. Dr. S.D. Kamat, Saraswati Nighantu, Chaukhambha Sanskrit Patishthan, Delhi, 2006.
12. Rajavaidya Pandit Shankar Dutta Gaida, Shankar Nighantu, Reprinted Edition, Chaukhambha Vidhyabhavan, Varanasi, 2002.
13. Bapalal G. Vaidya, Nighantu Adarasha, Reprint Edition, Vol II, Chaukhambha Bharti Academy, Varanasi, 2002.
14. Vaidyaacharya Keshava, Hridayadipika Nighantu and Siddhamantra, Commentary of Vopadeva, Edited by Prof. Priyavrat Sharma, Chaukhambha Amarbharti Prakashan, Varanasi- 221001, 1977.
15. Prof. P.V. Sharma, Dravyaguna Vijnana, Reprint, Vol. II, Chaukhambha Bharti Academy, Varanasi, 2008.
16. Anonymous, The Ayurvedic Pharmacopoeia of India, Edition 1st, Part-1, Vol.III, Govt. of India. Ministry of Health and Family welfare, Deptt. Of I.S.M. & H., NewDelhi 1990, Reprint 2001.
17. Vaidya Vishnu Mahadev Gogte, Ayurvedic Pharmacology and Therapeutic uses of Medicinal plants, Bhartiya Vidya Bhawan, Mumbai- 400007, 2000.
18. Dr. J.L.N. Sastry, Dravyaguna vijnana, Vol. II, Chaukhambha Orientalia, Varanasi.
19. Shree Chadraraja Bhandari, Vanaushadi Chandrodaya, Chaukhambha Sanskrit Sansthan, Varanasi, 2000.
20. Vaidya Gopinatha Parika, Vanaushadi Ratnakar, Part- 5, Sudhanidhi Kayalaya, Vijayagadha (U.P.).
21. Vaidya Banavarilal Mishra, Dravyaguna Hastamalaka, Edition 5th, Publication Skima, Jaipur-Indore, 2005.